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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

REPORT AND RECOMMENDATIONS
OF THE
PRESIDENT
TO THE
EXECUTIVE DIRECTORS
ON THE
PROPOSED LOAN
TO THE
BHUMIPHOL ELECTRICITY AUTHORITY

August 13, 1957

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

REPORT AND RECOMMENDATIONS OF THE PRESIDENT
TO THE EXECUTIVE DIRECTORS ON A
PROPOSED LOAN TO THE
BHUMIPHOL ELECTRICITY AUTHORITY
THAILAND

1. I submit the following report and recommendations on a proposed loan in an amount equivalent to \$66 million to the Bhumiphol Electricity Authority for a multipurpose project in Thailand.

PART I - HISTORICAL

2. Thailand has suffered from a grave power shortage since the end of the war. In the early post-war years the Government began to investigate various thermal and hydroelectric projects to meet this shortage; and finally decided to construct a large hydroelectric plant on the Ping River at Yanhee, 260 miles northwest of Bangkok. This project was chosen because of its large power potential and it had additional advantages in that the benefits to agriculture and river transport resulting from it would be considerable.

3. The Royal Irrigation Department prepared a report on the project and submitted it to the Bank in 1952. In March 1953 the Government inquired whether the Bank would consider making a loan for the project; and the Bank replied that it would first be necessary for consultants to do a thorough engineering study. The Government engaged the U. S. Bureau of Reclamation for this study and the Bureau's report was made available to the Bank on April 10, 1956. On April 20, 1956 the Government formally applied for a Bank loan to cover the estimated foreign exchange cost of the project.

4. The Bureau's report showed that the project was technically feasible. In view of the very large investment involved the Bank wished, before proceeding to a further technical study of the project, to satisfy itself, first, that the economic benefits were likely to compare favorably with the benefits which would be derived from alternative investments and, second, that the Government would be able to meet the foreign and local currency costs of the project and of the necessary related works. Study of these questions in Thailand and in the Bank during the summer of 1956 led the Bank, in October, to inform the Government that the project merited further consideration. The Bank, therefore, proposed to send a mission to Thailand to make a technical appraisal of the project, to investigate the power market and to study the agricultural benefits which would result. The mission visited Thailand in November and December of 1956. After further studies by consultants in February and March 1957, the mission reported its findings in April.

5. The mission reported that the project was technically sound, that it should be given high priority in the economic development plans of Thailand and that, therefore, it could be the basis for a Bank loan. The Bank concluded, on the basis of the mission's report, that an independent

agency should be established to operate and to develop the power facilities in the area to be serviced by the project and that this agency should be the borrower of the proposed loan. The Bank also considered it desirable to consult the Government about the financial and economic policies it intended to follow in order to ensure that the carrying out of the project would not have inflationary effects on the economy of the country.

6. After discussions with representatives of the Government in Washington, a member of the Bank's staff visited Bangkok in May 1957 to discuss these matters with the Ministers concerned. The Government agreed to the necessity for establishing an agency to operate and to develop the power facilities and to be the borrower of the proposed loan; but expressed the wish that negotiations for the loan should be completed before the necessary legislation was put before the National Assembly. The Bank agreed to this procedure on the understanding that the legislation would be passed and the Authority established without undue delay. The Government further informed the Bank that it was aware of the financial and economic problems which might arise in carrying out the project and indicated the policies which it proposed to pursue in order to maintain economic stability.

7. In June, representatives of the Government came to Washington and agreed with the Bank on the draft of legislation to establish the independent agency to be known as the Bhumiphol Electricity Authority. Loan negotiations took place in Washington in July and early August 1957. These were conducted on behalf of the Government by a team headed by Mr. Savet Piampongsant, the Deputy Minister of Finance.

8. The proposed loan would increase the total amount of Bank loans to Thailand to \$106,800,000. The loans already made are as follows:

Year: 1950	First Railway Loan	\$ 3,000,000
1950	First Port Loan	\$ 4,400,000
1950	Irrigation Loan	\$18,000,000
1955	Second Railway Loan	\$12,000,000
1956	Second Port Loan	\$ 3,400,000

As of June 30, 1957, \$34,019,000 of these loans had been disbursed. Maturities amounting to \$2,549,000 had been sold, \$2,575,000 had been repaid and the Bank held, as of this date, altogether about \$29 million.

PART II - DESCRIPTION OF THE LOAN

9. The Borrower would be the Bhumiphol Electricity Authority, an autonomous agency to be established by legislation. The signature of the loan documents would await the passage of this legislation and the satisfactory establishment of the Authority.

Guarantor

10. The Guarantor would be the Kingdom of Thailand, a member of the Bank.

Amount

11. The proposed loan would be in various currencies in an amount equivalent to \$66 million.

Purpose

12. The purpose of the loan would be to assist the Bhumiphol Electricity Authority in carrying out the first stage of a multipurpose project on the Ping River, 260 miles northwest of Bangkok, for production and transmission of power, for irrigation and flood control and for improvement of river transportation.

Amortization

13. The proposed loan would be for 25 years, and would be amortized by semi-annual payments beginning October 15, 1963 in amounts to be determined on the basis of the interest rate, and calculated to retire the loan on October 15, 1982.

Interest, Commission and Commitment Charges

15. The rate of interest on the loan which would include the statutory commission of 1% per annum and the premiums on prepayment would be determined at the time of signing the Loan Agreement. The commitment charge would be 3/4 of 1% per annum and would accrue 60 days after the date of the Loan Agreement.

PART III - THE PROJECT

15. The project to be financed by the proposed loan is part of a program for generation, transmission and distribution of electric power, control of water for irrigation and flood protection in the central part of Thailand and for the improvement of navigation on the Ping and Chao Phya Rivers. The project and the program are appraised and described in the Technical Report dated August 8, 1957. Attachment No.1, R 51 - 71.

16. The project to be financed by the proposed loan consists of the construction of a dam across the Ping River, about 260 miles northwest of Bangkok. The dam would create a large reservoir with a capacity of some 12 billion cubic meters. Two generating units with a total capacity of about 140,000 kw would be installed in the powerhouse. A switchyard, two transmission lines having a combined total length of about 650 miles, and the necessary substations will be constructed to serve Bangkok and eleven load centers en route.

17. In order to supply the minimum requirements of the growing power demand, particularly in Bangkok, until power from the project becomes available, construction of additional thermal generating capacity is required. To distribute this larger future load, the present inadequate distribution system in Bangkok will have to be rehabilitated and considerably expanded. The construction of additional thermal capacity in Bangkok and of new distribution systems in Bangkok and in the provinces, is that part of the program which has to be carried out simultaneously with the Bank project but will not be financed by the proposed loan. The Government has undertaken to ensure that this program will be carried out and to provide the necessary funds. Thermal generating units of a total capacity of about 40,000 kw will be installed in Bangkok. Twenty diesel units, each with a capacity of 1,000 kw are already on order and preliminary studies are in progress for a new steam plant of about 20,000 kw.

18. The future development of the project would comprise successive installation of additional generating units until the full capacity, estimated at 560,000 kw, is reached. Two additional high tension transmission lines to Bangkok and other transmission lines, ultimately connecting 33 of Thailand's 71 provinces, will be built in step with the growing power demand. According to present estimates, the entire capacity of the power plant would be fully utilized by 1975.

19. The estimated cost of the Bank financed project is \$100 million equivalent, of which \$66 million would be required in foreign exchange. The cost of the thermal generating facilities in Bangkok and of the rehabilitation and expansion of the distribution systems is now estimated at \$25-30 million equivalent, mostly in foreign exchange. The additional cost of expanding the project to its ultimate capacity of 560,000 kw, including transmission lines, would be about \$80 million equivalent. The cost of about \$700 per kw of installed capacity for the first two units is high but this cost would drop to about \$320 per kw when full development is reached.

20. The Bank financed project will be constructed by the Royal Irrigation Department on behalf of the Authority. The additional generating plants in Bangkok will be constructed by the Authority and by the time the project is completed, the Authority will be operating all major generating and transmission facilities in its service area. The Government has undertaken to unify the Bangkok distribution system and to establish a new distribution agency which will be responsible for the construction of the new distribution system and for its operation.

21. The dam will impound about 12 billion cubic meters of water which will serve both to generate power and to control the flow of water in the river. The storage capacity of the reservoir will have important advantages for the Chao Phya Irrigation System which services a large area in the central plain and will also greatly reduce losses from floods.

PART IV - APPRAISAL OF THE LOAN

22. Thailand's economic position and prospects are described in the Economic Report, dated August 12, 1957 (Attachment No.2 R - 57-71)

Economic Situation

23. Thailand's economic position is basically sound. Real output has increased by more than 4% per annum since 1951 and promises to continue to expand at nearly this rate. Agricultural production, which has shown an upward trend in recent years, is likely to continue to be the main economic activity. Rice production, representing one-half the total value of agricultural output, reached nearly twice the prewar level in 1956. The output of rubber, the second main cash crop, increased slightly in 1956, reaching more than three times the prewar level. Industry is still in its infancy but in recent years a number of enterprises have been established which produce light industrial goods such as textiles, paper, cement, glass and sugar. Indications are that the growth in national output can be expected to exceed the rate of growth of the population.

24. Since the financial difficulties experienced in 1953 and early 1954, the fiscal and monetary position of the country has improved significantly and became relatively stable in 1956. Recently the Government has taken steps to bring about further improvements in fiscal management and in the planning of investment. It is also taking certain measures to increase revenues and it may be expected that there will be a gradual increase in domestic resources for the financing of development expenditures. In addition to the proposed Bank loan, investment expenditures for the project and all related facilities will absorb about 15% of the resources available for Government investment over the next six years. In the past five years public investment expenditures have been concentrated on basic facilities such as highways, railways, port development and irrigation. However, power development has lagged far behind demand and, consequently, various restrictions on the consumption of power have had to be imposed. A major increase in the supply of power is essential to ensure a balanced development of the economy. Since the project would not only accomplish this objective, but also contribute important agricultural benefits to the economy, the Government's decision to give the Bhumiphol Project first claim on the funds available for development financing is justified.

25. Thailand's balance of payments position is strong. An unfavorable swing in the trade balance in 1956 was more than offset by increased disbursements under foreign aid and loans, and official foreign exchange reserves rose by some \$12 million during the year. In the first five months of 1957 they increased another \$11 million to a level of \$322 million, or the equivalent of 90% of 1956 imports. After the next one or two years, during which export prices and foreign aid disbursements may decline, it is anticipated that there will be a growth of about 3% annually

in Thailand's export earnings. Assuming internal monetary stability, this should be adequate to finance the normal import needs of the economy, including those arising from a gradually increasing public investment program. Service payments on Thailand's external debt of about \$85 million are at present comparatively high since about one-half of this debt is medium-term. Even so, they absorb less than 4% of export earnings.

Justification of the Project

26. Present generating capacity in Thailand consists entirely of steam and diesel units totalling approximately 100,000 kw, exclusive of privately owned plants. Of this total 85,000 kw is installed in the service area of the Authority and of this 58,000 kw is in Bangkok. The serious inadequacy of public power supply is indicated by the fact that generating capacity installed in private, industrial and commercial enterprises exceeds the capacity of the public utility systems. All large consumers of power are forced to install their own power plants, almost all of which are diesel units producing at high cost. Demand in Bangkok has increased since 1950 at a rate of about 15% per annum despite the severe restrictions and the unreliable service. Future growth of demand is expected to be at the rate of 8% per annum in Bangkok area and 5% per annum in the provinces. At these rates of growth, the 140,000 kw plant at the project will be fully loaded when power from the project becomes available in 1963 and some of the less economic units, both private and public, can be shut down. Thereafter it is expected that the capacity of the project will be increased, subject to availability of funds, in step with the growth of demand, and will be fully developed by about 1975.

27. The estimated cost of generating and transmitting power to Bangkok is reasonable. On the assumption that power would be sold at wholesale rates high enough to bring a return of 10% on the total investment in the project, the rates would be about 15% lower than the present cost of production in Bangkok.

28. Studies have been made of the costs of producing power from thermal plants using either domestic lignite or imported fuels. These studies show that on completion of the first stage of the project the rates at which power from the project could be delivered at the main load centers would be somewhat lower than the rates which would have to be charged for power from thermal stations. This differential increases with the further expansion of the capacity of the Bhumiphol project.

29. The large reservoir created by the Bhumiphol dam would enable the flow of water to the Chao Phya Irrigation System to be regulated in such a way that deficiencies at the beginning or at the end of the monsoon could be overcome. The barrage at Chainat for the construction of which a Bank loan was made in 1950 has little storage capacity. Therefore, it can provide no water for agriculture during the dry season and

cannot give protection from periodical floods. The construction of the Bhumiphol dam will make cultivation during the dry season possible and will very considerably reduce losses due to floods. It is estimated that the value of the resulting increase in agricultural production will be about \$15 million a year. The value of additional rice production available for export is expected to be about \$5 million per annum.

Prospect of Fulfillment of Obligations by the Borrower and the Guarantor

30. The Bhumiphol Electricity Authority would be the Borrower. It has power to fix its rates. Provisions in the Bhumiphol Electricity Authority Act and in the Loan Agreement ensure that rates will cover all operating expenses and debt service, leaving a surplus sufficient to finance a substantial proportion of future expansion. The Guarantee Agreement provides, furthermore, that the Authority shall retain all of its earnings until completion of the full development of the project. According to the financing plan for the first stage of the project, the Authority will have no other debt than to the Bank. Through the retaining of the expected substantial earnings and the repayment of the Bank loan, the initial debt equity ratio of two to one is expected to improve rapidly so that by 1969 a debt equity ratio of about one to one would be reached. The Borrower should have no difficulty in meeting its obligations to the Bank under the loan contract.

31. As stated above, the present economic situation in Thailand is basically sound and the prospects of the future are good. If the proposed loan is made, the Government should have adequate resources to meet the local currency costs of the Bhumiphol Project and of the investment in thermal power stations and distribution facilities to be made in the next few years, provided that other public investments will be limited to projects of highest priority. If no foreign aid is available or if the level of foreign aid is much reduced over the next few years, Thailand would probably have to draw down its foreign exchange reserves; but this reduction in reserves is likely to be of a size which would still leave total reserves at a high level. The Government has decided to adopt fiscal, investment and external debt policies designed to ensure that the project will be carried out without risk of adverse effects on the economy. A draft letter addressed to the Bank, setting forth details of these policies, is attached (No. 1). The debt service on the proposed loan of about \$6 million per year is well within the country's capacity. I am satisfied that the Guarantor should be able to meet all its obligations under the Guarantee Agreement and to provide the Borrower with foreign exchange as required to service the Bank loan.

PART V - LEGAL INSTRUMENTS AND LEGAL AUTHORITY

32. Drafts of the Loan Agreement and of the Guarantee Agreement were attachments Nos. 3 and 4 of R 57 - 71. Attached hereto is the Report of the Committee, provided for in Article III, Section 4 (iii) of the Articles of Agreement of the Bank (No. 2).

33. The Loan Agreement conforms generally to the normal pattern of the Bank's loan agreements. Attention is drawn to the following provisions:

- (a) The Borrower shall employ suitably qualified and competent engineering consultants and constructors for the carrying out of the project. The selection of the engineering consultants and the nature and scope of their responsibilities shall be subject to agreement between the Bank and the Borrower (Section 5.01 (b)).
- (b) The Borrower shall, as soon as practicable during the initial years of construction of the project, construct and put into operation thermal generating facilities in the Bangkok area with a capacity of not less than 30,000 kw and not more than 50,000 kw (Section 5.08 (a)).
- (c) The Borrower shall carry out the subsequent stages (as defined in Section 1.02) in pace with the growth of power demand. Before completion of the subsequent stages the Borrower shall not, without the prior agreement of the Bank, undertake any additional power project other than the thermal generating facilities referred to in paragraph (a) above, (Section 5.08 (b)).
- (d) The Borrower shall establish and maintain prices for the sale of electricity at a level which would cover operating expenses, debt service and provide a reasonable surplus (Section 5.09).
- (e) An additional condition of effectiveness is that the Borrower shall have entered into arrangements satisfactory to the Bank with the Royal Irrigation Department for the carrying out of the project (Section 7.01).
- (f) Since the Borrower has not yet been established, an additional matter to be included in the legal opinion to be furnished to the Bank is that it has full power and authority to construct or cause to be constructed and to operate the project and the subsequent stages and has all necessary rights and powers in connection therewith (Section 7.02).

34. The draft Guarantee Agreement contains a guarantee of performance as well as of payment and an undertaking by the Guarantor to provide the Borrower with such funds as are needed to carry out the project or the construction of the thermal generating facilities described in paragraph 33 (a) above. In addition attention is drawn to the following provisions:

- (a) The Guarantor shall not later than January 1, 1959 (or such other date as may be agreed upon) establish a single agency to operate the distribution facilities in Bangkok (Section 3.01 (a)).

- (b) The Guarantor shall undertake the modernization and expansion of the distribution systems in Bangkok and in the provinces and shall employ engineering consultants satisfactory to the Guarantor and the Bank for this purpose (Section 3.01 (b)).
- (c) The Guarantor undertakes to transfer to the Borrower not later than January 1, 1959 (or such other date as may be agreed upon) all generating plants and equipment in Bangkok now owned by it in Bangkok (Section 3.02).
- (d) Until the completion of the subsequent stages, the Guarantor shall permit the Borrower to retain any surplus arising out of its operations for financing the cost of any development that may be undertaken by the Borrower to satisfy the growth of power demand (Section 3.03).

In other respects the Guarantee Agreement follows the usual pattern.

35. I am satisfied that the proposed loan complies with the Articles of Agreement of the Bank.

PART VI - RECOMMENDATIONS

36. I recommend that the Bank make a loan to the Bhumiphol Electricity Authority, an agency of the Government of Thailand, to be established by law, to be guaranteed by the Kingdom of Thailand, in an amount in various currencies equivalent to \$66 million for a total term of 25 years and on such other terms as are provided for in the form of the Loan Agreement and Guarantee Agreement and in the form of Resolution attached hereto (No. 3), and that the Executive Directors adopt such a resolution.